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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/461,416 | 12/16/1999 | MARC DE BLOCK | 2121-154P | 3779 |

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EXAMINER

HAAS, WENDY C

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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1661

DATE MAILED: 04/22/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/461,416

Applicant(s)

DE BLOCK, MARC

Examiner

Wendy C Haas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 24-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 24-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Claims 24-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Flavell et al. in view of Dodds et al., Taylor or Cumming et al. and further in view of Strack et al., Muller et al., Berglund et al., Harding et al., Moldau, Uotila et al., Chen et al., or Masojidek et al., Chandler et al., Misra et al. or Anandarajah et al.

Flavell et al. teach that seedling mitochondrial activity in wheat is related to seedling vigor and to potential grain yield. They further teach that mitochondrial activity and efficiency is basic to the control of growth and yield in plants and that increased mitochondrial activity accurately reflects increased grain yield.

Flavell et al. do not teach a correlation between seed yield and respiration rate under stress conditions; a method for assessing the viability of a plant cell by measuring the electron flow in the mitochondrial electron transport chain through measuring the plant cell's capacity to reduce 2, 3, 5-triphenyltetrazolium chloride; subjecting the plant cells to a stress condition; comparing their viability to that of a control; measuring the plant cell's capacity to reduce 3-(4, 5-dimethylthiazol-2-yl)-2,3 diphenyl-2H-tetrazolium; specific stress conditions or concentrations of stressors; a variety of specific explants; or use of transgenic plant material.

Dodds et al. teach a method for assessing the viability of a plant cell by measuring the electron flow in the mitochondrial electron transport chain through measuring the plant cell's capacity to reduce 2, 3, 5-triphenyltetrazolium chloride.

Taylor teaches the total respiration rate of a plant is the sum of its maintenance respiration rate and its growth respiration rate and further teaches that plants that allocate a greater total portion of their respiratory output to growth are more stress tolerant.

Cumming et al. teach that plants under environmental stress shift their respiratory energy expenditures from growth to maintenance. Stress tolerant plants exhibit a "spike" in respiration rate when exposed to stress as they are able to shift their respiratory energy to maintenance, adjust to stress, and resume growth. Intolerant plants also shift their respiratory energy to maintenance but do not exhibit the same degree of increased respiration, as they are still unable to recover from stress.

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Strack et al. teach subjecting plants to salt stress. Muller et al. teach subjecting plants to osmotic stress. Berglund et al. teach stressing plants by subjecting them to high irradiation with UV light and by incubation with a PARP inhibitor. Harding et al. teach stressing plants with high heat and measuring photosynthetic electron transport. Moldau teaches stressing plants with sub lethal dose of air pollution chemicals. Uotila et al. teach stressing plants with sub lethal doses of herbicides. Chen et al. teach stressing plants with sub lethal doses of heavy metals. Masojidek et al. teach stressing plants by irradiation with UV light. Chandler et al. teach stressing callus cultures of *Brassica napus* with salt. Misra et al. teach genetic transformation and selection of heavy-metal tolerant *B. napus* cell lines. Anandarajah et al. teach thermal stress of *B. napus* somatic embryos.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to measure mitochondrial activity to estimate seed yield, as taught by Flavell et al. Utilization of the method of Dodds et al. *per se*, or as modified by obvious parameter optimizations known in the art, such as measurement of the capacity of the plant or explant to reduce other chemicals known to measure the electron flow in the mitochondrial electron transport chain would be one obvious, effective method known in the art at the time the invention was made to measure this mitochondrial activity.

As Taylor taught at the time the invention was made, stress tolerant plants exhibit higher growth rates and, as taught by Cumming et al., exhibit a greater respiration rate when exposed to stress. As Flavell et al. noted a positive correlation between growth rate, respiration and yield, it would have been obvious to one of ordinary skill in the art at the time the invention was made to subject the plants of interest to stress prior to assessing mitochondrial activity for selection purposes in order to more efficiently select the highest yielding plants.

Specific stressors such as specific salts, osmotic agents or PARP inhibitors known in the art and specific concentrations of same are other obvious parameter optimizations applicants might choose to explore. Applicants would reasonably be expected to use the method for any plant part or species of interest, including transgenic plants. One motivation to combine these techniques is provided by Flavell et al. who note that when yield potential can be estimated at the seedling stage, plant breeding programs can operate more efficiently.

The skilled artisan would have been motivated to optimize experimental conditions to assess the fitness of any particular species of interest, in response to any particular stressor of interest. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

B. Applicant's arguments filed December 18, 2002 have been fully considered but they are not persuasive. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of

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ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Conclusion

No claims are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Future Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wendy C. Haas whose telephone number is (703) 308-8898. The Examiner is usually available from 9:30 a.m. to 5:00 p.m. at the above telephone number.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Bruce Campell, can be reached on (703) 308-4205. The fax number for the group is (703) 305-3041 or (703) 308-4242.

Any inquiry of a general nature or relating to the status of this application should be directed to the Matrix Customer Service Center whose telephone number is (703) 308-0196.

W. C. Haas



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